



**PATENT APPLICATION**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q54505

Hitoshi MATSUMOTO, et al.

Appln. No.: 09/318,268

Group Art Unit: 2853

Confirmation No.: 1128

Examiner: Blaise L. MOUTTET

Filed: May 25, 1999

For: INK CARTRIDGE, INK-JET PRINTING APPARATUS, AND REFILLING  
DEVICE

**SUBMISSION OF APPELLANT'S BRIEF ON APPEAL**

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an original and two copies of Appellant's Brief on Appeal. A check for the statutory fee of \$320.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,

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WASHINGTON OFFICE

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**APPELLANT'S BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192**

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 1.192, Appellant submits the following:

**I. REAL PARTY IN INTEREST**

The real party in interest is SEIKO EPSON CORPORATION by virtue of an assignment executed by Hitoshi MATSUMOTO and Takahiro NAKA (Appellant, hereafter), on July 8, 1999, and recorded by the Assignment Branch of the U.S. Patent and Trademark Office on August 17, 1999 (at Reel 010163, Frame 0995).

**II. RELATED APPEALS AND INTERFERENCES**

To the knowledge and belief of Appellant, the Assignee, and the undersigned, there are no other appeals or interferences before the Board of Appeals and Interferences that will directly affect or be affected by the Board's decision in the instant Appeal.

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**III. STATUS OF CLAIMS**

Claims 1-40 are pending in the application. Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Bullock et al. (U.S. Patent No. 5,699,091). Claim 13 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Bullock et al. in view of Koitabashi et al. (U.S. Patent No. 6,000,778). Claim 24 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Bullock et al. in view of Childers et al. (U.S. Patent No. 6,126,265). Claims 25 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bullock et al. in view of Childers et al. and further in view of Kobayashi et al. (EP 841173).

Claims 1-7, 9-12, 14-23 and 27-40 stand allowed.

**IV. STATUS OF AMENDMENTS**

In response to the final Office Action (Paper No. 20) in which claims 1-11, 13, 14, 16-20 and 24-26 were finally rejected, Appellant filed an Amendment under 37 C.F.R. § 1.116, a Notice of Appeal and a Terminal Disclaimer on July 22, 2003. On September 15, 2003, an Advisory Action was issued allowing entry of the Amendment under 37 C.F.R. § 1.116 and allowing claims 1-7, 9-12, 14-23 and 27-40. The rejections to claims 8, 13 and 24-26 were maintained, and are the subject of this appeal.

**V. SUMMARY OF THE INVENTION**

The present invention relates to an ink jet type printing apparatus which is supplied with ink from a replaceable ink cartridge, and ejects ink droplets from nozzle openings onto a recording medium for achieving the printing. *See Specification, page 1, lines 6-9.* A conventional ink-jet printing apparatus includes, for example, a print head, and an ink cartridge

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for supplying ink to the print head. *Id. at 1:13-15*. The print quality is determined by the resolution of the print head, and by the physical characteristics of the ink. *Id. at 1:21-2:5*. Therefore, in order to improve the print quality, the characteristics of the ink, as well as the drive signal to be applied to the print head, have been improved. *Id.* Thus, ink cartridges have been supplied with memory devices to store information related to the manufactured ink characteristics. *Id. at 2:13-18*.

Additionally, in order to help the environment, ink cartridge manufacturers have been recycling used ink cartridges. *Id. at 2:19-24*. However, the recycling process of various manufacturers is not uniform and thus, the ink cartridge undergoes significantly different changes depending on its recycling process. *Id. at 2:25-3:2*. Hence, the present invention solves this problem by providing a replaceable ink cartridge having a rewriteable memory device that is capable of storing the history and conditions of use of the ink cartridge so that at the time of recycling, the optimum reproduction processing suited for each individual ink cartridge, can be instituted in accordance with the data recording in the memory device. *Id. at 3:5-26*.

Referring to Figs. 1(A) and 1(B), ink cartridges 10, 20 of the present invention are shown. A container 11, 21 contains ink, and an upper side thereof is sealed by a lid 12, 22. *Id. at 5:6-7*. A porous member is filled in the container 11, 21, and is impregnated with the ink. *Id. at 5:7-8*. An ink supply port 13, 23 is formed at the bottom surface of the container 11, 21, and when the container is mounted on a carriage 42, the ink supply port 13, 23 is hermetically

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engaged with ink supply needles 44, 45. *Id. at 5:9-12.* A circuit board 30 is fixedly mounted on one side surface of the container 11, 21. *Id. at 5:12-13.*

Contacts 31 for electrical contact with the printing apparatus are formed on the side of the circuit board 30, as shown in Figs. 2 (a) and 2 (b), and are disposed on an outer surface when the circuit board 30 is mounted on the ink cartridge. *Id. at 5:14-17.* Semiconductor memory device 32 is mounted on the surface of the circuit board 30 in such a manner that it does not prevent the formation of the contacts 31. *Id. at 5:17-20.*

Fixed data, such as the production date, the lifetime and the maximum number of refilled times that can be made, are stored in the semiconductor memory device 32, and the other non-fixed data, such as the current number of times that the ink cartridge has been refilled, maintenance conditions, what parts have previously been replaced in the ink cartridge, physical characteristics of the ink... can be stored in a rewriteable manner in the memory device 32.

## **VI. ISSUES**

The issues on appeal are as follows:

1. Whether claim 8 stands stand properly rejected under 35 U.S.C. § 103(a) as obvious over Bullock et al. (U.S. Patent No. 5,699,091).
2. Whether claim 13 stands properly rejected under 35 U.S.C. § 103(a) as being obvious over Bullock et al. in view of Koitabashi et al. (U.S. Patent No. 6,000,778).
3. Whether claim 24 stands properly rejected under 35 U.S.C. § 103(a) as obvious over Bullock et al. in view of Childers et al. (U.S. Patent No. 6,126,265).

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4. Whether claims 25 and 26 stand properly rejected under 35 U.S.C. § 103(a) as obvious over Bullock et al. in view of Childers et al. and further in view of Kobayashi et al. (EP 841173).

**VII. GROUPING OF CLAIMS**

For each ground of rejection, the claims stand or fall together. Accordingly the claims should be considered in the following groups:

1. Claim 8 stands alone and does not stand or fall with any other claim.
2. Claims 13 and 24-26 stand or fall together.

**VIII. ARGUMENTS**

**A. Claim rejections under 35 U.S.C. § 103**

**Claim 8**

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Bullock et al. (U.S. Patent No. 5,699,091) in view of Tadokoro (U.S. Patent No. 5,550,956). To establish a *prima facie* case of obviousness, the Examiner must provide a convincing line of reasoning (by a preponderance of evidence) of why one skilled in the art would have found the combination of the teachings of the cited references obvious. *See MPEP § 2143.01*. Appellant respectfully submits that the references cited above by the Examiner fail to provide any suggestion or motivation to combine the teachings of the references.

Specifically, Appellant submits that the references fail to provide any suggestion or motivation for storing data indicative of the history of the ink cartridge of Tadokoro on the memory device of the cartridge of Bullock. The Examiner acknowledges that "Bullock et al.

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fails to disclose storing data indicative of the history of the ink cartridge.” Thus, Bullock admittedly does not teach the desire or suggestion to have such data stored on the memory device of the cartridge. The Examiner then relies on Tadokoro to teach “storing history information of a consumable such as an ink cartridge in a printer.” (emphasis added). Again, the Examiner acknowledges that Tadokoro does not teach the desire or suggestion to have such data stored on the memory device of the cartridge. Nevertheless, the Examiner, in a conclusory manner, alleges that the motivation for combining the teachings of Bullock and Tadokoro “would have been to shorten the operation time of maintenance and inspection as taught by column 1, lines 20-28 of Tadokoro.” However, col. 1:20-28 of Tadokoro teaches that in order “[t]o shorten the operation time of maintenance and inspection, it is advantageous to use the history information of the color printer.” In other words, Tadokoro teaches to store such history information of the printer on the memory device of the printer, and not history information of the ink cartridge on the memory device of the ink cartridge.

The Examiner has not provided any explanation as to why one skilled in the art would desire to store data indicative of the history of the ink cartridge on the memory device of the ink cartridge. Neither reference is concerned with keeping the history of the ink cartridge with the ink cartridge. For example, in Tadokoro, any data related to the ink cartridge (such as volume of ink, but not history data) is stored on the memory device of the printer. The printer memory calculates values, such as number of sheets printed, and when the ink cartridge is replaced, Tadokoro does not update any values on a memory device of the ink cartridge.

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Furthermore, Tadokoro does not adjust its printing methods based on the history of the ink cartridge because Tadokoro is not concerned with the history of the ink cartridge. However, only Appellant's disclosure teaches the significance of storing the history information of the ink cartridge on the memory device of the ink cartridge. As Appellant explains, when an ink cartridge mounted on and used at least partially by a first printer is detached and thereafter mounted on a different, second printer, the ink cartridge can be effectively and efficiently used when a memory device of the ink cartridge contains data indicative of data of the history of the ink cartridge including a past ink environment in which the ink cartridge was used. For example, Applicant explains that if, based on the cartridge history that is kept in the cartridge memory, the cartridge is a recycled cartridge, the amount of ink drawn during normal printing operation is increased so as to prevent degradation of the cartridge and maintain proper print quality.

Similarly, as the Examiner admits, "Bullock et al. fails to disclose storing data indicative of the history of the ink cartridge." Bullock also is not concerned with storing or using data related to the history of the ink cartridge in its printing process. Only Applicant has provided an explanation for placing history data of the ink cartridge on the memory device of the ink cartridge. Neither reference recognizes this advantageous feature, and thus no motivation to combine the teachings of the two references exists.

Therefore, the cited references fail to provide any motivation to store history information of the ink cartridge on the memory device of the ink cartridge. Accordingly, Appellant respectfully requests that the rejection of claim 8 under 35 U.S.C. § 103(a) be reversed.



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**Claims 13 and 24**

Claim 13 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Bullock et al. in view of Koitabashi et al. (U.S. Patent No. 6,000,778). Claim 24 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Bullock et al. in view of Childers et al. (U.S. Patent No. 6,126,265). The cited references fail to teach or suggest storing data representative of the minimum ink amount in the memory of the ink cartridge.

Bullock determines whether to send the user a message that the ink in the ink cartridge is getting low based on comparing an estimate of the remaining ink to a pre-recorded supply threshold. The pre-recorded supply thresholds are not stored on the memory device of the ink cartridge. Also, the pre-recorded supply threshold is not a minimum ink amount, but instead is an amount used to signal the user that the ink is getting low. As Bullock explains, "[i]f the ink is found to be less than 25% of full capacity, a message is provided to the user indicating that fact." *See Bullock, col. 7:16-18*. In other words, the pre-recorded supply thresholds are simply a level at which a user is signaled that the ink is below 25% full capacity. Thus, Bullock fails to teach storing a minimum ink amount in the memory of the ink cartridge. Furthermore, it would not have been obvious to one skilled in the art to store a minimum ink amount on the memory device of the ink cartridge because none of the cited references teach the use or significance of a minimum ink amount.

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A minimal ink amount prevents the printer from damaging the ink cartridge and differs depending on the type of an ink cartridge, the configuration of an ink cartridge, or the like. The minimal ink amount may differ on a cartridge-by-cartridge basis even if the cartridges are of the same type and configuration. For example, a minimal ink amount of an ink cartridge employing an ink absorbing member is generally larger than a minimal ink amount of an ink cartridge employing a valve mechanism. That is, some type of an ink cartridge employing an ink absorbing member has a minimal ink amount of, for example, 2 to 3%, whereas some type of an ink cartridge employing a valve mechanism has a minimal ink amount of, for example, 1%. Also, a recommended minimal ink amount would differ depending on the supplier who manufactures and supplies the ink cartridges.

If a printer memory, not an ink cartridge memory, stores data relating to or representative of a minimal ink amount, it is difficult or impossible to accommodate such differences in minimal ink amount. That is, storing data relating to or representative of a minimal ink amount in an ink cartridge memory device makes it possible to set a minimal ink amount on a cartridge-by-cartridge basis, thereby enabling efficient and effective use of ink contained in an ink cartridge. Since the cited references fail to recognize the above-described feature, it would not have been obvious to modify the Bullock system in a manner to store the minimum ink amount on the ink cartridge.

The Examiner argues that "since no absorbing member or valve mechanisms are claimed," arguments related to these terms are not persuasive. *See Advisory Action, p. 4.* First,

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Appellant has used these mechanisms as an illustrative example of the importance of having the minimum ink amount be stored on the memory device of the ink cartridge. Second, the example was used to show that Bullock cannot resolve the problem of different cartridges having different minimum ink amounts because Bullock uses a percentage of the full capacity of the ink cartridge instead of minimum ink amounts. Consequently, since the same type of cartridge may have differing minimum ink amounts, Bullock may damage certain ink cartridges because it does not recognize the minimum ink amounts for each individual ink cartridge. Third, Appellant used these examples to show that only Appellant, and none of the cited references, recognize the importance of having the minimum ink amount be stored on the memory device of the ink cartridge. As a result, there is no motivation provided in any of the cited references to have the minimum ink amount be stored on the memory device of the ink cartridge. Thus, it would not have been obvious to modify the Bullock reference, or any other cited reference, to provide a minimum ink amount and store that minimum ink amount in the memory device of the ink cartridge.

Therefore, since Koitabashi and Childers fail to cure the deficiencies of Bullock, Appellant respectfully requests that the rejection of claims 13 and 24 under 35 U.S.C. § 103(a) be reversed.

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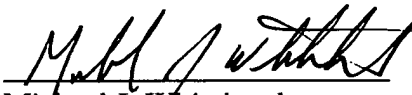
Claims 25 and 26

Claims 25 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bullock et al. in view of Childers et al., as applied to claim 24, and further in view of Kobayashi et al. (EP 841173). Since claims 25 and 26 depend from claim 24 and since Kobayashi does not cure the deficient teachings of Bullock and Childers with respect to claim 24, Appellant submits that claims 25 and 26 are patentable at least by virtue of their dependency from claim 24. Therefore, Appellant respectfully requests that the rejection of claims 25 and 26 under 35 U.S.C. § 103(a) be reversed.

The present Brief on Appeal is being filed in triplicate. Unless a check is submitted herewith for the fee required under 37 C.F.R. § 1.192(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

  
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WASHINGTON OFFICE  
**23373**  
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Date: October 22, 2003

**APPENDIX**

**CLAIMS 1-40 ON APPEAL:**

1. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;  
an ink supply port for supplying the ink from said ink chamber to the print head; and  
a memory device formatted to store data indicative of the history of the ink cartridge, data indicative of past environment of use of the ink cartridge, and data indicative of past cleaning of the print head, said memory device having an area in which the data is stored in a rewritable manner.

2. (previously presented): An ink cartridge according to claim 1, wherein the data includes data related to the number of reproduction times of the ink cartridge.

3. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;  
an ink supply port for supplying the ink from said ink chamber to the print head;  
a memory device formatted to store data indicative of the history of the ink cartridge, said memory device having an area in which the data is stored in a rewritable manner; and

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wherein the data includes data indicative of past maintenance processing required for use in a reproduction of the ink cartridge.

4. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;

an ink supply port for supplying the ink from said ink chamber to the print head;

a memory device formatted to store data indicative of the history of the ink cartridge, said memory device having an area in which the data is stored in a rewritable manner; and

wherein the data includes data indicative of past maintenance processing required for use in a reproduction of the ink cartridge;

wherein the data includes data indicative of a past condition of cleaning.

5. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;

an ink supply port for supplying the ink from said ink chamber to the print head;

a memory device formatted to store data indicative of the history of the ink cartridge, said memory device having an area in which the data is stored in a rewritable manner;

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wherein the data includes data indicative of a maintenance processing required for use in a reproduction of the ink cartridge; and

wherein the data includes data indicative of a condition of exchange of a part of the ink cartridge.

6. (original): An ink cartridge according to claim 1, wherein the data includes data related to the time of final use of the ink cartridge.

7. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;

an ink supply port for supplying the ink from said ink chamber to the print head;

a memory device formatted to store data indicative of the history of the ink cartridge, said memory device having an area in which the data is stored in a rewritable manner;

wherein the data includes data indicative of the time of final ink depletion of the ink cartridge; and

wherein the data includes data indicative of past maintenance processing required for use in a reproduction of the ink cartridge..

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8. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;  
an ink supply port for supplying the ink from said ink chamber to the print head;  
a memory device formatted to store data indicative of the history of the ink cartridge, said memory device has an area in which the data is stored in a rewritable manner; and  
wherein the data includes data indicative of a past environment in which the ink cartridge was used.

9. (original): An ink cartridge according to claim 1, wherein said memory device stores data indicative of the date of manufacture of the ink cartridge.

10. (original): An ink cartridge according to claim 1, wherein said memory device stores data indicative of a lifetime of the ink cartridge.

11. (original): An ink cartridge according to claim 1, wherein said memory device stores data indicative of the time of final use of the ink cartridge.

12. (original): An ink cartridge according to claim 1, wherein said memory device stores data indicative of the number of reproductions of the ink cartridge which can be effected.



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13. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

- a container having an ink chamber for containing ink therein;
- an ink supply port for supplying the ink from said ink chamber to the print head; and
- a memory device for storing data related to the ink or the ink cartridge, said memory device storing therein data relating to a minimum ink amount to be contained in the ink cartridge, said memory device having an area in which data indicative of a residual ink amount is stored in a rewritable manner;

wherein said ink cartridge is operable to alter an ink discharge operation during cleaning of the print head based on the stored data relating to the minimum ink amount and the residual ink amount.

14. (previously presented): An ink-jet printing apparatus comprising:

- a print head for ejecting ink droplets;
- an ink cartridge containing ink therein for supplying the ink to said print head;
- a memory device storing data related to the ink cartridge, data related to past environment of use of the ink cartridge, and data related to past cleaning of the print head;
- a control device accessible to said memory device for controlling said print head in accordance with data supplied from the exterior, said control device controlling a charging of the

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ink into said print head in accordance with data, stored in said memory device, when said ink cartridge is attached to the printing apparatus; and

said control device determines whether the print head needs cleaning and controls the cleaning operation.

15. (original): An ink-jet printing apparatus according to claim 14, wherein said control device judges from the data in said memory device whether or not the attached ink cartridge is a reproduced one.

16. (previously presented): An ink-jet printing apparatus according to claim 14, wherein the control of the ink charging operation is directed to the amount of ink drawn.

17. (original): An ink-jet printing apparatus according to claim 14, wherein said control device causes data, related to the conditions of use of said ink cartridge, to be stored in said memory device when said ink cartridge is to be detached from the printing apparatus.

18. (previously presented): An ink-jet printing apparatus according to claim 17, wherein said data, related to said conditions of use, is the time of ink depletion of said ink cartridge.

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19. (original): An ink-jet printing apparatus according to claim 17, wherein said data, related to said conditions of use, is conditions of maintenance of said print head during the time when said ink cartridge is attached to the printing apparatus.

20. (original): An ink-jet printing apparatus according to claim 17, wherein said data, related to said conditions of use, is data related to an environment during the time when said ink cartridge is attached to the printing apparatus.

21. (previously presented): An ink-jet printing apparatus according to claim 14, wherein said control device judges from the data, stored in said memory device, whether or not a next reproduction of the ink cartridge is possible.

22. (previously presented): An ink-jet printing apparatus according to claim 14, wherein said control device judges whether or not the next reproduction of the ink cartridge is possible in accordance with the data stored in said memory device, and the control device displays an indication that the ink cartridge is to be discarded when it judges that the reproduction is impossible.

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23. (previously presented): An ink-jet printing apparatus according to claim 21, wherein said judgment is made in accordance with the number of reproductions, a lifetime, a time period after detection of ink depletion, and an environment of use.

24. (previously presented): An ink-jet printing apparatus comprising:  
a print head for ejecting ink droplets;  
an ink cartridge containing ink therein for supplying the ink to said print head;  
a memory device storing data representative of a preset minimum ink amount and residual ink in the ink cartridge; and  
a control device accessible to said memory device for controlling said print head in accordance with data supplied from the exterior, said control device judging whether a cleaning operation is necessary in accordance with the data stored in said memory device.

25. (original): An ink-jet printing apparatus according to claim 24, wherein said control device executes the cleaning operation when the residual ink amount is greater than the sum of the preset minimum amount of ink and an amount of ink which is consumed by the cleaning operation.

26. (original): An ink-jet printing apparatus according to claim 24, wherein said control device executes a brief cleaning operation when the residual ink amount is the preset minimum

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ink amount but less than the sum of the preset minimum ink amount and an ink amount which is consumed by the cleaning operation.

27. (original): A cartridge reproducing device for an ink cartridge for an ink jet type printing apparatus having a print head, the reproducing device comprising:

means for reading data, related to a history of use of the ink cartridge to be reproduced, from a memory device provided on the ink cartridge;

a control device which controls a reproduction processing apparatus in accordance with said data, and causes at least data, representing the number of reproductions and the time of reproduction, to be stored in said memory device after the reproducing operation is finished; and

said control device determines when and if the print head needs cleaning and controls the cleaning.

28. (original): A reproducing device according to claim 27, wherein said control device causes data, related to conditions of maintenance of the ink cartridge, to be stored in the memory device after the reproducing operation is finished.

29. (original): A reproducing device according to claim 27, wherein said reproduction processing apparatus includes at least a cartridge cleaning device, and an ink injecting device.

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30. (original): A reproducing device according to claim 27, wherein said control device judges from the data in the memory device whether or not the reproduction is possible.

31. (previously presented): A reproducing device according to claim 27, wherein said control device controls the degree of cleaning by cleaning means in accordance with the data in said memory device.

32. (original): A reproducing device for an ink cartridge according to claim 27, wherein said control device effects a washing of the ink cartridge with ink to be reproduced in accordance with the data in the memory device.

33. (previously presented): An ink-jet printing apparatus comprising:  
a print head for ejecting ink droplets;  
an ink cartridge containing ink therein for supplying the ink to said print head;  
a memory device storing data related to the ink cartridge, data related to environment of use of the ink cartridge, and data related to cleaning of the print head; and  
a control device accessible to said memory device for controlling said print head in accordance with data supplied from the exterior, said control device judges, from the data stored in said memory device, whether the next reproduction of the ink cartridge is possible.

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34. (original): An ink jet printing apparatus according to claim 33, wherein, wherein said control device causes data, related to the conditions of use of said ink cartridge, to be stored in said memory device when said ink cartridge is to be detached from the printing apparatus.

35. (previously presented): An ink-jet printing apparatus according to claim 14, wherein said control device judges whether a next reproduction of the ink cartridge is possible in accordance with the data stored in said memory device, and the control device displays that the ink cartridge is discarded if it judges that the reproduction is impossible.

36. (previously presented): A method of operating a printing ink cartridge reproducing device having a data memory device, a reproducing control device, an ink charging device and an ink discharge device, said method comprising:

- reading ink cartridge data from an ink cartridge having an ink memory circuit;
- evaluating the ink cartridge data using the reproducing control device;
- determining whether regeneration of the ink cartridge is possible; and
- recharging the ink cartridge using the ink charging device if the reproducing control device determines that regeneration of the ink cartridge is possible.

37. (previously presented): The method of operating a printing ink cartridge reproducing device of claim 36 wherein recharging the ink cartridge comprises:

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discharging residual ink from the ink cartridge using the ink discharge device;  
determining whether a part of the ink cartridge needs to be replaced using the  
reproducing control device;  
replacing the part of the ink cartridge that needs to be replaced;  
determining whether cleaning of the ink cartridge is needed by the reproducing  
control device;  
cleaning the ink cartridge if the reproducing control device determines that the ink  
cartridge needs to be cleaned;  
determining whether the ink cartridge needs to be washed with ink using the  
reproducing control device; and  
washing the ink cartridge if the reproducing control device determines that the ink  
cartridge needs to be washed with ink.

38. (previously presented): The method of operating a printing ink cartridge reproducing  
device of claim 37 wherein the reproducing control device uses data stored in the data memory  
device and data stored in the ink memory circuit.

39. (previously presented): The method of operating a printing ink cartridge reproducing  
device of claim 37 wherein the reproduction control device is within a printer.



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40. (previously presented): The method of operating a printing ink cartridge reproducing device of claim 37 wherein the reproduction control device is within a computer.